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- 4. Yampolskiy merely hints at the use of phosphate coatings for resistance to scuffing and wearing, particularly during the break-in period. This application is particularly common in the automotive immatry in the USA.
- 5. The shortest phosphating time mentioned by Yampolokiy seems to be five minutes. Even faster methods requiring as little as one minute are used in the USA although they do not give maximum corrosion resistance.
- 6. Except under magnesium alloys where "organic solvents" are mentioned, organic degressing media other than alcohol, gasolime and benzene apparently are not used. Most of the degressing media appear to be alkaline solutions. In the USA much use is made of special organic degressing media, such as carbon tetrachloride, trichlorethylene and stoddard's.
- 7. Salt spray as a test is not mentioned all sigh considerable use appears to be made of 3% sodium-chloride solutions at room temperature.
- d. Among the new processes:
 - 1. While details of the Cromak process are given, a dip method based on a mickel sulfate-ammonium sulfate-zime sulfate solution is said to be "far more reliable"; and chemical exidation of zime is claimed to be "best for corrosion resistance". As far as is known, the latter two methods are not being widely used-if at all-im the USA; although chromate contings such as the Cromak process are used to a considerable extent, as are phosphate contings, which Yampolskiy mentions elsewhere.
 - 2 An fer as is known, he electrolytic phosphating mathod is used commercially in the USA. While Yempolskiy states the direct-current electrolytic process is experimental, he indicates that the alternating-current method is being used in the automotive industry in the USER.
 - 3. Chapter V treats at length am exide-phosphate process developed by Chain, where the coating consists of calcium or barium phosphate and iron exides. Bilfinger im the introduction to the German edition states that this process is still relatively unknown im (East) Germany. As far is known, a process of this type is not used in the USA, although a number of the exide and phosphate coating processes are proprietary, so complete deviate of their compositions are not city of the advantages listed for this exidential maintain the exthat usality to exidizing methods for iron and steel; the remain less purported superiority to phosphating are not clear.
 - e. The 20 references are predominately Soviet. It must strike the Germans as rather odd that the many German articles in this field are not mentioned; for example, there is not a single reference to W. Machn, probably the most widely known German authority in this field. It is perhaps for this reason that Bilfinger in his introduction to the German edition writes that Yampolskiy has deliberately emitted literature references for the various methods described.

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S.I. Bugkin and S.I. Dobrovol'skiy: Investigation of Isochromatic Lines in Transparent Models Undergoing Permanent Plastic Deformation. Doklady Akademii Nauk SSSR 88 (1953) no. 5, pp 799/802

- c. In transparent models, stressed clastically and observed under polarized light, the isochromatic lines signify the positions of equal normal stresses. The authors had previously observed similar isochrematic lines when such models were stressed plastically and had proposed that these lines denoted equal shear stresses. Comparative tests were therefore made with four types of transparent materials, stressed both elastically and plastically.
 - 1. The stress pattern changed very little on transition from the clastic to the plastic range.
 - 2. The pattern was similar in all the cases studied regardless of the type of material and type of deformation
 - 3. Differences in the stress pattern of the various types of material may be ascribed first of all to the effect of residual stresses, which are different for different materials.
 - 4. Of the four materials studied, only the silver chloride favored the formation of residual stresses of all three orders; the other materials gave only residual stresses of the first order.

To study the stress distribution in polycrystalline metals during plastic deformation, transperent models of amorphous, very plastic material should be used to get a regulated distribution of stresses following the laws of plasticity. Ir some cases it might be useful to determine the stresses also in an electic-plactic material, which will permit appreciable clastic deformation.

b. Photoelasticity is one of the older methods of studying stress distribution. In general, however, its use has been confined to the region of elastic bea havior.

> M. Heteuyl: Stresses in Rotating Parts. Netal Progress 39 (1941) pp 200/201 C. Herger and T.V. Buckwalter: Improving engine axles and pisten rods

Metal Progress 39 (1941) pp 202/206

W.M. Marray: Seeing stresses with photo-clasticity. Mertal Progress 39 (1941) pp 195/200, also Stress Analysis Metheds-Choice Determined by Part's Design and Application. Materials & Methods 23 (1946) pp 1002/1006, also Measurement of Surface Stresses. Surface Stressing of Metals. ASM (1947) pp 19/32

B. Segarman; A Photoclastic Approach to Stress Modifications Caused by Inhomogeneities. Symposium on Internal Stresses in Metals and Alloys. The Institute of Metals (1948) pp 281/288

c. Bakelite and callulated are parhaps the most common materials for photoelastic models but the idea of using silver chloride is not new. As a matter of fact, Mye used it for very similar purposes to those of Gubkin and Dobrovol'skiy, namely for the photoelastic investigation of plastically deformed actorial.

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